

GOVERNMENT RESPONSE TO PANDEMICS AND ITS EFFECT ON LEVELS OF
TERRORISM

by
Jake Lewis

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Abstract

Government response to pandemics often mimic many other variables that have been noted to increase violence, such as increased individual restrictions, a negatively affected economy, or closed political opportunity structures. While the literature surrounding these topics are well-explored, there seems to be lack of research that seeks to learn if how a government responds to a pandemic produces the same results. The research question for this project is: *How does government response to a pandemic influence the level of terrorism in that country?* This paper seeks to provide insight to this question through a detailed case study of three government's responses to pandemics, and a following descriptive statistics section which compares the number of terrorist attacks in that country during the time frame.

The cases under review will be A/H1N1, better known as Swine Flu, in Mexico in 2009, Severe Acute Respiratory Syndrome Coronavirus (SARS) in China in 2003, and the Zika virus in Brazil in 2015. Each case study will be evaluated through an original analytic tool created for this project, dubbed the 'pandemic report card'. Each country's corresponding grade will then be compared to the trends of terrorist attacks in that country before, during, and after each pandemic. The results of this paper do not offer substantial evidence to conclude that a relationship exists between these two variables. While this research project accepts the null hypothesis, several other avenues for future research are laid out which builds from this project.

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Introduction

The world has seen pandemics throughout history, from the Bubonic Plague to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Often to combat these pandemics, governments are forced to resort to more extreme measures such as enforcing restrictions on businesses, enacting travel restrictions, introducing quarantine, and encouraging social distancing. We have a general idea of what happens to a country post-pandemic, such as a suffering economy, government restrictions, and even the rise of anti-government sentiment manifested through protests. These consequences of a pandemic are not far-fetched. A possible consequence of pandemics that is not largely researched, however, is the effect that these restrictive measures governments have on the level of terrorism that country will experience. Therefore, this paper will take those factors into the broader context of government effectiveness during a widespread virus to determine if government efforts against pandemics affect the level of terrorism as well. The research question for this paper is: how does government response to a pandemic affect the level of terrorism in that country?

This paper will pull from a variety of existing fields in social science research. It will consult the discussion on how the presence of political opportunity structures influence the presence of violence in a society, how government restrictions/repression breeds violence, how grievances produce government resistance, how a country's economic health influences violence, how natural disasters in general affect violence, and the political consequences of pandemic responses. This research will also analyze the scholarly discussion of three recent pandemics in three different countries, and base

government performance off of guidelines set forward by the U.S. Department of Health and Human Services.

This study will approach the topic from several avenues. First there will be a qualitative analysis of: A/H1N1 (Swine Flu) in Mexico in 2009; Severe Acute Respiratory Syndrome Coronavirus (SARS) in China in 2003; and Zika in Brazil in 2015. This information will be collected from scholarly articles that discuss the performance of each country in combatting their specific pandemic. These case studies will then be analyzed against four guidelines provided by a plan to combat pandemics provided by the U.S. Department of Health and Human Services (HHS) in the *HHS Pandemic Influenza Plan*. Next, descriptive statistics will be used to compare the level of political violent activity before, during, and after each virus in their specific country. This information will be gleaned from the Global Terrorism Database. Finally, the two sections will be compared to determine if there is a significant relationship or not.

Literature Review

The independent variable (IV) in this study is a qualitative evaluation of the response of governments to pandemics, and the dependent variable (DV) is the level of terrorism. Because this paper is looking to add value by explaining why terrorism increases in a certain situation, the following literature review will focus largely on addressing the scholarly discussion pertinent to the DV. While this section focuses primarily on the DV, below is a line of argumentation as to why it is also relevant to the IV.

To explore the relationship between government response to a pandemic and the level of terrorism that a country experiences, the current scholarly discussion concerning

several topics must first be addressed. This paper must consult the relationship between factors that mimic potential government response to a pandemic, and their propensity to cause violence in general. By following this methodology, a logical chain of events can be drawn between the variables in this paper. The literature review will start by laying the foundation with ideas from social movement theory (SMT) which relate these ideas to the research topic at hand. Next, a section will discuss pertinent information concerning how direct consequences of pandemics and government response to those pandemics influence violence. Next, this section will explore how natural disasters act as a shock to the system and influence violence. Finally, the literature review will explicitly introduce the gap in the research that this paper seeks to address.

Pertinent Aspects of Social Movement Theory

To ensure that the reader has an adequate grasp of how SMT is related to the topic at hand, one has to look no further than the work of Rodney Stark. Stark relays that one of the fundamental approaches to social movements is known as the collective behavior approach, which is the action of groups in response to real or perceived grievances.¹ This applies to the relationship we are exploring because groups that engage in terrorism are a collective response to a grievance, which in this case is possibly the government response to a pandemic. Furthermore, Stark relays that along with the presence of grievances, one characteristic necessary for a social movement to exist is a precipitating event.² Taking the idea of a precipitating event further, Beck relays that one aspect of a three-fold theoretical SMT approach to social movements is the presence of political opportunities

¹ Stark, Rodney. "Social Change and Social Movements." *Sociology*. (Belmont, CA: Wadsworth, 1992): 611-632.

² Ibid.

or external constraints.³ Beck's elaboration of this idea is important as it frames precipitating events in a light amicable to this paper, which is the reaction of the population to an initial government action.

It is important to note that the ideas above mention social movements. Groups that engage in terrorism fall under the umbrella of social movements, but are characterized differently due to their violent nature. In expanding these ideas in SMT to the topic at hand, a few similarities are noticeable. First, grievances are often a necessary component for a social movement to be born. Secondly, the emergence of the pandemic or certain government reactions to the pandemic, may very well act as a precipitating event. Whatever the event is, if it is enough of a shock to the general populace, it is possible that social movements follow.

Political Opportunity Structures and Violence

Political opportunity structures (POS) are institutions or characteristics of government functions which allow individuals to either enact change or restrict their ability to challenge the government. Some studies have found that open POS reduce the risk of violence, while closed POS have the propensity to increase the possibility of violence.⁴ While looking at protests in American cities and the effect their POS has on the occurrence of protests, Eisinger found that the chance of protests and anti-government sentiment often increases when open POS are not present.⁵ While noting the near impossibility to generally classify POS as they differ country to country, Gleditsch and

³ Beck, Colin. "The contribution of Social Movement Theory to Understanding Terrorism." *Social Compass* 2, no. 5, 2008: 1565-1581.

⁴ Eisinger, Peter. "The Conditions of Protest Behavior in American Cities." *The American Political Science Review*, 67, no. 1, 1973, 11-28.; Gleditsch, K., and Ruggeri, A. "Political opportunity structures, democracy, and civil war." *Journal of Peace Research* 47, no. 3, 2010: 299-310.

⁵ Eisinger, Peter. "The Conditions of Protest Behavior in American Cities." *The American Political Science Review*, 67, no. 1, 1973, 11-28.

Ruggeri state that strong democratic institutions decrease the risk of conflict.⁶ For our purposes, democratic regimes can be externalized as open POS as democratic regimes are often identified by these institutions, such as freedom speech, free and fair elections, etc.

It is important to note that POS do not have to be physical institutions, but can be foundational ideas inherent in a government as well such as transparency or freedom of speech. Both domestic and international transparency have been found to have a positive relationship with the level of terrorist attacks committed.⁷ The researchers theorize that transparency, while a positive trait in many instances, has the possibility to attract terrorism due to the publicity they will receive.⁸ This idea of terrorist organizations being attracted to transparent targets is important, as transparency is a fundamental aspect in an effective government response to a pandemic.

It is important to consider how POS affect violence because this relationship can be directly expanded to a government response to pandemics and its effect on violence. As open and closed styles of POS either enable or disable the population's ability to enact change, pandemics can often result in restrictions by the government on the population. While POS are related to enacting governmental change, parallels between this academic conversation and this research question are present. In general, a closed POS, which is noted to cause anti-government sentiment, are government restrictions on the population. As stated earlier, during pandemics, governments may enact restrictions, which draws the connection between these two ideas.

⁶ Gleditsch, K., and Ruggeri, A. "Political opportunity structures, democracy, and civil war." *Journal of Peace Research* 47, no. 3, 2010: 299-310.

⁷ Bell, Sam, Chad Clay, Amanda Murdie, and James Piazza. "Opening Yourself Up: The Role of External and Internal Transparency in Terrorism Attacks." *Political Research Quarterly* 67, no. 3, 2014: 603-614.

⁸ Ibid.

Government Restrictions and Violence

There remains a back-and-forth discussion in academia concerning the effect of government repression on the occurrence of violence. Some scholars have taken the stance that government repression is often ineffective in efforts to quell dissent and decrease the strength of anti-government forces.⁹ While looking at a cross-national study of the effect government repression has on counterinsurgency efforts, Hultquist finds that while repression has merits in certain circumstances, more often than not, state repression causes further conflict.¹⁰ Granted, most of the debate in academia concerning government repression and violence concerns violent repression or indiscriminate violence enforced upon the population. While this takes repression to an extreme, it still presents the idea that as governments use more restrictive measures, violence is more likely.

To further this point in connection with this research project, we need to look no further than the comparison some scholars have made in the theoretical realm of the relationship between freedom and violence.¹¹ Categorizing countries on a scale of one through six, with one being the least repressive and six being the most, Wolfgang relays that governments who are either highly permissive or highly restrictive experience low levels of violence.¹² On the other hand, it is those countries in the middle spectrum or the level of restrictiveness who experience more violence.¹³ This is an important perspective to note as it relates directly to the research question at hand. Granted that governments are not likely to respond to pandemics in widespread violence against civilians, however,

⁹ Hultquist, Philip. "Is Collective Repression an Effective Counterinsurgency Technique? Unpacking the Cyclical Relationship between Repression and Civil Conflict." *Conflict Management and Peace Science* 34, no. 5, 2017: 507-525.

¹⁰ Ibid.

¹¹ Wolfgang, Marvin. "Freedom and Violence." *Educational Researcher* 5, no. 5, 1976: 7-10.

¹² Ibid.

¹³ Ibid.

they are likely to increase restrictions which encroach on individual liberties, such as restrictions on movement or forced business closures. So, while repression might not be as intense as possible, as we saw above, slight increases in restrictions are known to have increased the level of violence.

Economic Considerations and Violence

While this next section might have a seemingly intuitive nature, it is important to consider the effect that economic considerations, especially poverty, have on the level of internal violence a country experiences. Certain economic characteristics, such as lower GDP per capita, youth unemployment, and the need to feel financially stable are all incubators for internal violence; this is in fact a self-feeding cycle, since countries that have experienced major acts of violence have a civilian population who is 21% poorer than stable countries.¹⁴ The World Bank Group admits that there are numerous countries with poor economic standings who do not succumb to internal violence, however, it is the combination of internal stressors, such as unemployment, and external economic stressors, such as price shocks, that increase a country's propensity to internal conflict.¹⁵ A common characteristic of pandemics is a negatively affected economy, either through domestic sectors being damaged or through the international response to isolate and restrict movement to the country affected.

Just as negative domestic economic characteristics increase the chance of violence, so do external shocks.¹⁶ While comparing the external shock of the lack of

¹⁴ The World Bank Group. *World Development Report 2011: Conflict, Security, and Development*. (Washington, DC: The World Bank, 2011).

¹⁵ Ibid.

¹⁶ Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112, no. 4, 2004: 725-753.

rainfall on African countries' economies, researchers generalized the findings to conclude that a negative shock on national growth of at least 5% increases the chances of internal conflict by 50%.¹⁷ Unfortunately, if economic shocks are severe enough, a self-feeding cycle begins of poor economies causing violence and violence causing low human development.¹⁸ These ideas are extractable to the research at hand as it identifies not only the risk of poor economic characteristics and its ability to cause violence, but the circular cycle it creates if harsh enough.

Natural Disasters and Violence

Getting into the direct correlation between natural disasters and its effect on violence, there are several considerations that need to be made. While largely unstudied in academia, some studies have concluded the positive relationship between natural disasters and violence.¹⁹ Nel and Righarts found that countries that experienced natural disasters are 50 times more likely to have violence follow than those who did not experience a natural disaster, with natural disasters resulting in large geological destruction causing the most violence, i.e. earthquakes and volcanic eruptions.²⁰ While disasters such as infections and insect infestations posed the least likely to increase the chance of violence, it was noted that any disaster which increases grievances, resource grabs, and the necessity of collective action response, all destabilize society.²¹

Just as natural disasters cause violence, there are related factors associated to pandemics which increase the possibility of violence. Viruses have a profound effect on

¹⁷ Ibid.

¹⁸ Kim, Namsuk and Pedro Conceicao. "The Economic Crisis, Violent Conflict, and Human Development." *International Journal of Peace Studies* 15, no. 1, 2010: 29-43.

¹⁹ Nel, Philip and Marjolein Righarts. "Natural Disasters and the Risk of Violent Civil Conflict." *International Studies Quarterly* 52, 2008: 159-185.

²⁰ Ibid.

²¹ Ibid.

society, with early cases showing us how the presence of unexplained disasters can cause humans to look for explanations, such as anti-Semitic violence during the Bubonic Plague or discrimination against Africans in China for fear of spreading Ebola.²² While science has evolved over time and helped us find explanations, other studies have looked at more contemporary ideas. The presence of health care facilities, entities, and personnel, present a target for violent attacks.²³ The World Health Organization (WHO) found that between 2014 and 2015, there were 594 attacks on various entities of the health care sector, with 62% of these attacks being intentional.²⁴

Political Implications of Pandemic Responses

When one considers the relationship between states, violent non-state actors (VNSAs), and the population, one should consider social contract theory and legitimacy. States have a social contract with their population to grant protection, services, and other human needs that grants the state legitimacy in the eyes of the population.²⁵ This is essentially an agreement from the government to provide for the population, and for the population to be governed. When states shirk on this duty, be it intentional malpractice or inability to perform, they lose legitimacy and VNSAs could seek to both decrease state legitimacy and increase their own through both violent and non-violent means.²⁶

²² Madhav, Nita, Ben Oppenheim, Mark Gallivan, Prime Mulembakani, Edward Rubin, and Nathan Wolfe. "Chapter 17 Pandemics: Risks, Impacts, and Mitigation." *Disease Control Priorities: Improving Health and Reducing Poverty*. 3rd edition. (Washington, DC: The International Bank for Reconstruction and Development/ The World Bank, 2017): 315-346.

²³ World Health Organization. *Report on Attacks on Health Care in Emergencies: Based on Consolidated Secondary Data 2014 and 2015*. (Geneva, Switzerland: World Health Organization, 2016).

²⁴ Ibid.

²⁵ Grynkewich, Alexis. "Welfare as Warfare: How Violent Non-State Groups Use Social Services to Attack the State." *Studies in Conflict & Terrorism* 31, no. 4, 2008: 351.

²⁶ Ibid, 353-355.

Anti-government groups and VNSAs alike might accentuate their attacks against state legitimacy with influence activities that seek to erode public trust in institutions which could result in an increased acceptance or participation in terrorism.²⁷ While this paper does not delve into influence activities, it does seek to explore the political repercussions of government response to a pandemic. As has been laid out by the previous sections, government responses are often restrictive and antithetical to democracy and individual liberty. Returning to the topic at hand, it may be possible that should states shirk in their response duties and do not effectively respond to the pandemic, VNSAs could seek to exploit this through violent and non-violent means to further their goals.

The Gap

The review of the current literature of this research topic has drawn a road map for the reader. Governments often have to place restrictions on the population to fight a pandemic and economies are often negatively affected due to pandemics, both of which cause violence. These are direct consequences of the presence of a pandemic, and by deduction, produce a logical conclusion that pandemics can increase the risk of violence. To further this line of argumentation, natural disasters in general cause violence and the presence of healthcare entities responding to pandemics have been intentionally targeted with violence in certain countries.

While remarkably similar to the deductions possible from this collection of works, this research's originality is grounded in how the research question is asked. While Nel and Righarts previously touched on the lack of an explanatory relationship between the

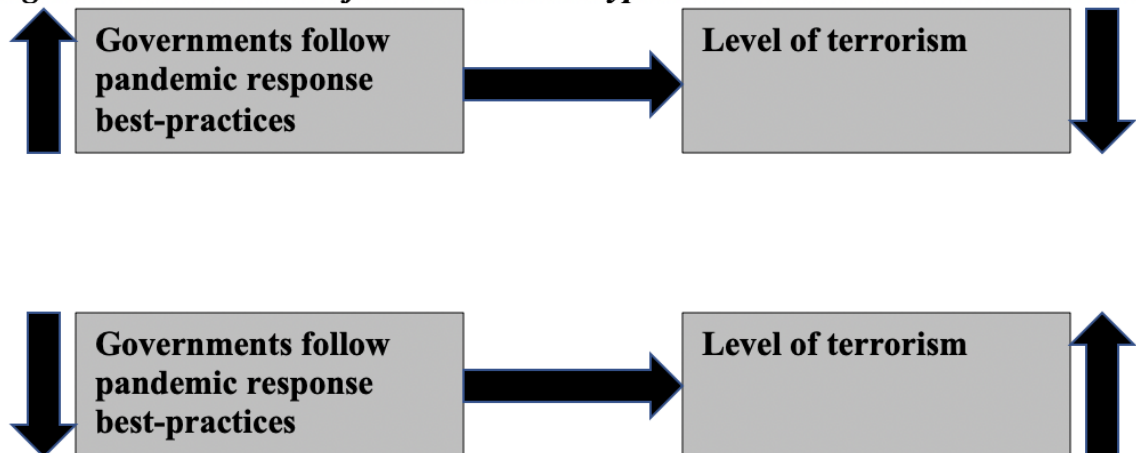
²⁷ Ingram, Haroro. "The Strategic Logic of State and Non-State Malign 'Influence Activities'." *The RUSI Journal* 165, no. 1, 2020: 13.

presence of epidemics and violence, this paper looks to address a gap in the current discussion.²⁸ Nel and Righarts looked at simply the presence of epidemics and their effect on subsequent violent outburst, this paper will qualitatively evaluate the way in which governments responded to epidemics and the effect that has on violence. Furthermore, this paper narrows the discussion from violence to terrorism.

Hypothesis

The alternative hypothesis for this research is that countries whose governments better followed pandemic response best-practices will experience lower levels of terrorism during and after the pandemic as opposed to governments which did not. In other words, as a country's government better responds to the pandemic located in their country, there will be less instances of terrorism during and after the pandemic. The null hypothesis for this project is that there will be no signification relationship between how a government responds to a pandemic and the level of terrorism. A visualization of the alternative hypothesis can be found in *Figure 1*.

Figure 1: Visualization of the Alternative Hypothesis



²⁸ Nel, Philip and Marjolein Righarts. "Natural Disasters and the Risk of Violent Civil Conflict." *International Studies Quarterly* 52, 2008: 159-185.

Variables and Operationalization

This study will seek to tie in all subsequent areas into a relationship between two variables. The IV is how a government responds to a pandemic. The IV will be gleaned by the case study analysis which will eventually give all countries a grade in four criteria and an overall average of those sections. The information in the case studies will be gleaned from peer-reviewed journals, reports from established organizations, and reputable media sites as needed. The grading criteria for the pandemic report card will be informed by the HHS document, *HHS Pandemic Influenza Plan*.²⁹ The sampling for this variable was completed by stratified sampling, with the population being every country in the world and the sample being randomly decided through only those countries who have had pandemics. This paper will consider pandemics to be viruses that fall under Phase Six, or the pandemic phase, of the World Health Organization pandemic phases; which is identified by outbreaks of the same virus in countries in a separate WHO region.³⁰

The DV is the level of terrorism. This information will be observed through the Study of Terrorism and Responses to Terrorism-University of Maryland Global Terrorism Database (GTD).³¹ The sampling for this data is purposive sampling. The population is every instance of terrorism in every country, but the sample must be restricted by the countries found in the IV. Therefore, the sample was purposefully chosen from each country included in the case study in each relevant timeframe.

²⁹ U.S. Department of Health and Human Services. *HHS Pandemic Influenza Plan*. November 2005.

³⁰ World Health Organization. *Pandemic Influenza Preparedness and Response: A WHO Guidance Document*. (Geneva, Switzerland; World Health Organization, 2009).

³¹ University of Maryland. *Global Terrorism Database*. <https://www.start.umd.edu/gtd/>.

I have chosen to measure terrorism for the main reason that terrorism is political in nature.³² The literature review was focused under the umbrella of SMT, which often theorizes about efforts to enact political change, as well as addressed the political consequences of a government's response to a pandemic. The second reason is that the GTD is the most comprehensive database on terrorism and is a reputable source of information, so focusing on terrorism and using one centralized database to inform the IV increases the reliability of data collection for that variable. The operationalization of this variable will be based off of the statistics presented by the GTD because it is the "most comprehensive unclassified database on terrorist attacks in the world" and since they have based collection off of a single, un-changing definition of terrorism since their inception, there is a constant data collection methodology.³³

Methodology

This research project will start with a comprehensive case study on three different countries and three different pandemics. The countries and their respective pandemics are chosen randomly based off of certain parameters. Illnesses that make up the possible sample are any virus that spreads across country borders, and more specifically spread to other WHO regions. After the cases are selected, the information collected will be guided by the *HHS Pandemic Influenza Plan*, which was created for "preparedness planning and response activities"³⁴ to pandemics. The same guiding information from this document will then be used as an analytic tool in the 'pandemic report card'.

³² Richards, Anthony. "Conceptualizing Terrorism." *Studies in Conflict & Terrorism* 37, no. 3, 2014: 213-236.

³³ University of Maryland. *Global Terrorism Database*. <https://www.start.umd.edu/gtd/>.

³⁴ U.S. Department of Health and Human Services. *HHS Pandemic Influenza Plan*. November 2005.

The pandemic report card is a grading scale created specifically for this project. The *HHS Pandemic Influenza Plan* was created in response to an uncertainty in response capabilities of the H5N1 virus and thus is centered around influenzas specifically. While this document is targeted towards influenzas preparation, I have decided that it is acceptable for other viruses as well since the underlying assumptions of the plan are also relevant in the case studies selected. The assumptions are: widespread transmissibility of the virus, asymptomatic cases while still infectious, great demands on healthcare systems, shortages in vaccines and antivirals, and disruption of community infrastructure.³⁵ One assumption: simultaneous outbreaks across the U.S. has been omitted given that none of the cases selected focus on the U.S. It should also be noted, that HHS updates this document periodically, and thus the document chosen to guide the pandemic report card is not the most up to date version. However, this version is adequate for this study as we are only looking for general and concrete ways to prepare for and respond to an epidemic. The 2005 *HHS Pandemic Influenza Plan* addresses those issues in general categories. The most up to date version, created in 2017, splits the general categories of the 2005 document into more categories. Therefore, while the 2017 document would result in more grading fields in the report card, it addresses the same general grading fields informed by the 2005 document.

Next, we will consider terrorist activity in each country studied in the case study section. This section will collect information on the number of attacks two years before, during, and two years after each pandemic in each country. The attacks under consideration will be any group active in the country of concern during the relevant time

³⁵ Ibid, 5.

frame who conducted terrorist attacks. After this data is collected, it will be compared to several descriptive statistic benchmarks such as mean, median, and mode; as well as be compared with scatterplots and trendlines to show the overall trend of violent activity in each country.

Case Study Analysis

This next section will dive into the case studies of three different pandemics in three different countries. First, the original analytic tool created for this project will be introduced, along with the underlying logic behind it. The current scholarly discussion surrounding these cases will be consulted, relayed, and then analyzed so that a clear understanding of government performance while combatting their pandemic can be gleaned. At the end of each case study, each country will receive their ‘pandemic report card’ which grades government response to the pandemic based on pre-established guidelines.

Pandemic Report Cards

The pandemic report card will consist of four sections which are designated as practices that HHS was taking in preparation for an influenza pandemic. The four sections are as followed: surveillance, investigation, and protective public health measures; vaccines and antivirals; healthcare and emergency response; and communications and outreach.³⁶ As this document delves into detail concerning U.S., and more specifically HHS, efforts to combat a pandemic, the cases will not be held to the standard that the HHS sets forward in this document. However, the broad sections listed above will be used to inform this research on the fields necessary for an adequate

³⁶ Ibid, F-35 – F-41.

response. Each case study will be laid out with enough detail so as to touch on each section, and for the audience to gain insight into that country's overall response efforts in that category. In each category, there will be a grade of A, which is the best score, through F, which is the worst score and subsequent reasoning behind that grade. Each line of reasoning will include a (+) to denote a positive aspect, or a (-) to denote a negative aspect. A visualization of the pandemic report card can be seen in *Figure 2*. Finally, each country will receive an overall categorization of their response of either failed, below average, average, above average, or excellent. These categories will be informed by the total points received in the pandemic report card; the legend that will inform letter grade translation to numerical score and the evaluation category requirements can be found in *Figure 3*.

Figure 2: Pandemic Report Card Template

Characteristics	Grade	Reason
Surveillance, Investigation, and Protective Public Health Measures	A, B, C, D, or F	Detailed response on why this country received this grade. Pros and Cons about their efforts in this category, etc.
Vaccine and Antivirals	A, B, C, D, or F	Detailed response on why this country received this grade. Pros and Cons about their efforts in this category, etc.
Healthcare and Emergency Response	A, B, C, D, or F	Detailed response on why this country received this grade. Pros and Cons about their efforts in this category, etc.
Communication and Outreach	A, B, C, D, or F	Detailed response on why this country received this grade. Pros and Cons about their efforts in this category, etc.

Figure 3: Overall Evaluation Legend

<i>A=5</i>	<i>B=4</i>	<i>C=3</i>	<i>D=2</i>	<i>F=1</i>
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Evaluation Category	Failed	Below Average	Average	Above Average	Excellent
Score Range	Total of 5	Total of 6-9	Total of 10-15	Total of 16-19	Total of 20

It is important to note that while efforts have been made to ensure clear and standardized grading of each case along the four guidelines, case studies are inherently open to interpretation by the researcher. Sound reasoning will be given as to why each grade was given. However, as there is no standardized global response plan or data set which grades each of these cases on centralized actions and benchmarks, different grades might be given to each country based on the researcher. It is important to note that the analysis of each case was completed by the same researcher, and the specific letter grade a country received in each characteristic section of the pandemic report card is not the most vital aspect of the paper. What is important is to lay out the general idea of how each government's overall response compared to the other case studies selected so one can gauge which countries responded better than others.

Mexico and Swine Flu in 2009

In 2009, Mexico experienced an outbreak of A/H1N1, better known as Swine Flu. The World Health Organization (WHO) categorized Swine Flu as a pandemic on June 11, 2009 and rescinded the pandemic label on August 10, 2009.³⁷ An influenza variant that spreads heavily among pigs, the 2009 outbreak of Swine Flu was a variant of the seasonal H1N1 virus that has been in circulation since 1977.³⁸ The 2009 Swine Flu outbreak was

³⁷ "WHO Pandemic Declaration". *Centers for Disease Control and Prevention.*; "WHO recommendations for the post-pandemic period." *World Health Organization.*

³⁸ "What is the pandemic (H1N1) 2009 virus?" *World Health Organization.* February 24, 2010.

different than previous outbreaks of the virus as it transmitted not primarily through pigs, but through human-human contact.³⁹ Swine Flu has a known incubation period between one and four days, with the contagious period starting around one day after symptoms are present and last for around six days.⁴⁰ In addition to the common symptoms associated with influenza, the 2009 A/H1N1 outbreak saw an increased report of vomiting and diarrhea, with causes of death attributed to high fever, respiratory failure, pneumonia, kidney failure, dehydration and hypertension, and electrolyte imbalances.⁴¹

Mexico was applauded in certain preparedness measures, such as having a stockpile of more than one million antiviral treatments and equipment which were rapidly mobilized, and had previously gathered, tested, and utilized communication materials which resulted in a well-developed media campaign.⁴² Despite adhering to an influenza preparedness plans, Mexico was caught off-guard by the A/H1N1 outbreak in 2009. The Mexican government operated on the assumption that any new pandemic would not be domestic-borne and would thus give Mexico a window of two weeks to prepare a response.⁴³ Overall, Mexico adequately implemented preparedness plans and followed global guidelines, but failed to overlook assumptions of where the virus would originate which resulted in a delayed domestic response.

While Mexico was unprepared for a domestic outbreak, one of the most applauded aspects of the Mexican government's response to the pandemic was the quick

³⁹ Jilani, Talha, Radia Jamil, and Abdul Siddiqui. "H1N1 Influenza (Swine Flu)." *StatPeals [Internet]*. (Treasure Island, FL: StatPearls Publishing, 2019).

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Del Rio, Carlos and Mauricio Hernandez-Avila. "Lessons from Previous Influenza Pandemics and from the Mexican Response to the Current Influenza Pandemic." *Archives of Medical Research* 40, no. 8, 2009: 678.

⁴³ Ear, Sophal. "Swine flu: Mexico's handling of A/H1N1 in comparative perspective." *Politics and the Life Sciences* 31, no. 1-2, 2012: 61.

action in notifying the international community of the situation and rapidly sharing isolates which helped create a vaccine.⁴⁴ While the domestic response to a pandemic is vitally important in determining how government actions would affect the population, the level of transparency and international cooperation notifies the world of the extreme nature of the situation. The cooperation between Mexico, the U.S., and Canada included mass communication systems, pandemic preparation plans, and sharing of doctors and supplies.⁴⁵ Mexico's president, Felipe Calderon, recognized the inabilities in Mexico's response capabilities, and the duty of his administration to both seek the best help possible for Mexicans and notify other countries of the gravity of the virus.

While Mexico rightly sought help with their North American neighbors, this reliance on international aid is inherent of domestic problems in Mexico. Poor domestic surveillance systems failed to identify infections in rural areas, Mexican laboratories were ill prepared to deal with the virus on their own, and an inherent lack of trust between the government and academia resulted in little to no attempts to recruit Mexican resources outside of the official health care sector.⁴⁶ Most of the related failures can likely be attributed to the assumption that any pandemic would not be domestic-borne, which did not allow Mexico to further prepare and forced their hand for immediate action. Some challenges noted from Mexico's response plan were the lack of an effective early detection system to minimize the delay between virus emergence and response by health care officials, as well as the lack of specialization, funding, and staffing of Mexican state

⁴⁴ Ibid, 53.

⁴⁵ Felbab-Brown, Vanda. "Lessons learned from Felipe Calderon's swift response to H1N1 in 2009." *The Brookings Institution*. March 27, 2020.

⁴⁶ Ear, Sophal. "Swine flu: Mexico's handling of A/H1N1 in comparative perspective." *Politics and the Life Sciences* 31, no. 1-2, 2012: 59-61.

laboratories.⁴⁷ While these factors and more, attributed to the lack of domestic response capable by Mexico, comprehensive review plans and proactive actions have since been undertaken to make Mexico self-reliant on combatting viruses.⁴⁸

Thanks to international cooperation, a vaccine was soon created to treat Swine Flu. Mexico, Canada, and the U.S. worked together to research, create, and distribute antivirals and vaccines.⁴⁹ Again, Mexico aptly recognized the limitations of its own research and development capabilities, and utilized their equally-affected neighbors to the north to rapidly find a vaccine. While they were successful in this measure, distributing the vaccine posed a dilemma. Mexico did not have a vaccine distribution plan ready and often fell prey to vaccine production delays, nor could some Mexicans afford the expensive vaccine.⁵⁰

The transparency that the Mexican government responded to the pandemic with, resulted in rapid government restrictions and community action being taken to restrict transmission of the virus. The Mexican president closed schools, movie theatres, and restaurants, and large gatherings were pursued at one's own discretion; by these measures, the Mexican government was trying to enforce social distancing.⁵¹ Mexico often aired public health experts on the news or sent out pertinent information directly to Mexicans, and thus the community response to the virus was unparalleled. The

⁴⁷ Hernández- Ávila, and Celia Alpuche-Aranda. "Mexico: Lessons learned from the 2009 pandemic that help us fight COVID-19." *Healthcare Management Forum*, 2020: 3-4.

⁴⁸ Ibid, 5.

⁴⁹ Ear, Sophal. "Swine flu: Mexico's handling of A/H1N1 in comparative perspective." *Politics and the Life Sciences* 31, no. 1-2, 2012: 54.

⁵⁰ Ibid, 57; Del Rio, Carlos and Mauricio Hernandez-Avila. "Lessons from Previous Influenza Pandemics and from the Mexican Response to the Current Influenza Pandemic." *Archives of Medical Research* 40, no. 8, 2009: 679.

⁵¹ Del Rio, Carlos and Mauricio Hernandez-Avila. "Lessons from Previous Influenza Pandemics and from the Mexican Response to the Current Influenza Pandemic." *Archives of Medical Research* 40, no. 8, 2009: 678.

community took this information and began modifying their social norms by wearing masks, focusing more on daily hygiene, and enforcing social distancing efforts.⁵² One of the unfortunate repercussions of the Mexican government's transparency was a negative impact on their already struggling economy; Mexico lost 1% of their GDP, which was around \$9billion USD, and certain sectors such as tourism were hard-hit.⁵³

The response of Mexico's health care system featured both successes and failures. Case studies looking at the mortality rate of Swine Flu in Mexico City at the National Institute of Respiratory Diseases concluded that out of records of 18 patients identified with the virus, 67% died.⁵⁴ However, studies that looked at records from the Hospital Civil de Guadalajara concluded that clinical staff were later able to correctly identify those most and least vulnerable to the illness so that patients could be handled as either outpatients or be hospitalized.⁵⁵ This system was a success with only 1% of patients needing re-evaluation and of the 104 patients hospitalized only 1% of them died.⁵⁶ Despite certain areas experiencing more deaths than others, Mexican health care systems showed a process of learning and ingenuity that correctly identified vulnerable patients and kept the system from getting overwhelmed.

The above synopsis of the Mexican government's efforts combatting Swine Flu informs the pandemic report card found below in **Figure 3**. The reasoning behind each

⁵² Ibid, 679.

⁵³ Ear, Sophal. "Swine flu: Mexico's handling of A/H1N1 in comparative perspective." *Politics and the Life Sciences* 31, no. 1-2, 2012: 58.

⁵⁴ Perez-Padilla, Rogelio, Daniela de la Rosa-Zamboni, Samuel Ponce de Leon, Mauricio Hernandez, Francisco Quinones-Falconi, et al. "Pneumonia and Respiratory Failure from Swine-Origin Influenza A (H1N1) in Mexico." *The New England Journal of Medicine* 361, 2009: 683.

⁵⁵ Rodriguez-Noriega, Eduardo, Esteban Gonzalez-Diaz, Rayo Morfin-Otero, Gerardo Gomez-Abundis, Jaime Briseno-Ramirez, et al. "Hospital Triage System for Adult Patients Using an Influenza-Like Illness Scoring System during the 2009 Pandemic-Mexico." *PLOS ONE* 5, no. 5, 2010: 7.

⁵⁶ Ibid, 8.

grade relates to information covered above. Mexico's overall response was above average, with a total score of 16.

Figure 4: Pandemic Report Card for Mexico's Response to Swine Flu

Characteristics	Grade	Reason
Surveillance, Investigation, and Protective Public Health Measures	B	(-) Surveillance was not effective in rural areas, (+) government quickly implemented restrictions on individual movement, (+) community heeded the government and adopted social distancing and quarantine measures.
Vaccine and Antivirals	C	(+) Pre-existing stockpile prior to virus, (+) international cooperation aided in the creation of a vaccine, (-) poor logistical planning on how to distribute vaccines, (-) vaccines were too expensive for some citizens.
Healthcare and Emergency Response	B	(-) Mexican laboratories were underfunded and unprepared to deal with the virus domestically, (+) health care officials identified those most vulnerable and kept hospitals open.
Communication and Outreach	A	(+) Government transparency and notification of the virus, (+) international cooperation and outreach, (+) direct communication with citizens.

China and SARS in 2003

SARS was first experienced in Guangdong province in China in November of 2002. WHO issued a global alert in March of 2003.⁵⁷ This was prompted when SARS was noticed to have spread internationally to different WHO regions starting around the

⁵⁷ "SARS: Information for the Public." *Michigan Department of Community Health*. December 2003.; "Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003." *World Health Organization*. September 26, 2003.

end of February 2003, which would then classify SARS in the confines of this project as a pandemic. The virus was relatively short-lived, with the last cases being reported in China around June 2003 and internationally around the end of July 2003, despite sporadic new cases on a much smaller scale.⁵⁸ A total of 8,098 cases are associated worldwide with SARS, to include 774 deaths.⁵⁹ The major common symptoms of SARS include high fever, respiratory symptoms, pneumonia, along with other minor symptoms such as dry cough and body aches.⁶⁰ While there is still debate over what the exact source of this virus is, some have given strong evidence that bats sold at markets in China are a likely contender, from which human-to-human transmission began.⁶¹

At the time of SARS, China's level of preparedness was not adequate compared to what was required by the epidemic. There was no government entity responsible for surveilling infectious diseases, there was no centralized system by which health care officials could report cases, state laws classify possible infectious diseases as a state secret, and public hysteria resulted in mass purchases which depleted reserves of antibiotics and flu medicine.⁶² Despite a lack of preparation on part of the Chinese, they seem to make up for that in part due to their ability to quickly implement restrictions and regulations. This will be touched on later in the case study, but given that China is an authoritarian government, they can bypass some of the bureaucratic obstacles other countries face given their style of governance.

⁵⁸ "Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003." *World Health Organization*. September 26, 2003.

⁵⁹ *Ibid*.

⁶⁰ "Fact Sheet: Basic Information about SARS." *Center for Disease Control*. January 13, 2004.

⁶¹ Wang, Lin-Fa, Zhengli Shi, Shuyi Zhang, Hume Field, Deter Daszak, and Bryan Eaton. "Review of Bats and SARS." *Emerging Infectious Diseases* 12, no. 12, 2006: 1834-1840.

⁶² Bouey, Jennifer. "From SARS to 2019-Coronavirus (nCoV): U.S.-China Collaborations on Pandemic Response." *Testimony presented before the House Foreign Affairs Subcommittee on Asia, the Pacific, and Nonproliferation*. February 5, 2020.

China's communication and transparency concerning SARS is often described by researchers in a negative light. To visualize this, a timeline of SARS does well: the first case was identified in China in November of 2002, the Chinese government spent the winter of 2002 trying to cover up the virus, and Chinese officials did not given details of the virus to WHO until March of 2003.⁶³ Granted, with the emergence of a new virus there might be a period of time where the virus has not yet been identified as a major health concern. However, the miscommunication and intentional cover up of the virus indicates that this was not the case. The five-month gap between the first identified case in China and notification of the disease to WHO is representative of how the Chinese government has tried to deal with cases of the virus inside their borders.

Internally, China shows just as much malpractice in communication and transparency as they did internationally. The Chinese government repressed information by censoring journalists and threatening imprisonment for spreading rumors concerning SARS.⁶⁴ These actions should not surprise the international community, as they are often characteristic of the authoritarian governance model of China. However, they do represent a complete lapse in judgement and negligence of their obligation to not only protect their citizens but limit domestic-born dangers to the international community. It was not until after a press conference on April 22, 2003 that China's government warned government officials not to cover up the virus anymore, relayed the importance of reporting possible SARS cases, and issued daily briefings to citizens about the actual

⁶³ Freedman, Amy. "SARS and Regime Legitimacy in China." *Asian Affairs* 36, no. 2, 2005: 170.

⁶⁴ Ibid, 171; Huang, Yanzhong. "The SARS Epidemic and Its Aftermath In China: A Political Perspective." *Learning from SARS: Preparing for the Next Disease Outbreak: Workshop Summary*. (Washington, DC: The National Academies Press, 2004): 128.

number of cases.⁶⁵ While China eventually recognized their mistake and addressed the virus publicly, their failure in doing so immediately resulted in widespread international and domestic transmission of the virus.

As previously mentioned, China's lack of communication and transparency largely enabled the virus to spread. The majority of international cooperation seems to stem from the WHO and other WHO countries. It was noted that despite other countries regularly updating the WHO on SARS cases and developments directly after the WHO global alert, China did not start regular communication until late April, about a month later.⁶⁶ Likewise, WHO investigation teams were denied entry to China for a time, and positive control measures implemented in Guangdong were not shared with other provinces or internationally until the end of April.⁶⁷ Seemingly, even after China recognized that transparency was needed, they further shirked on this duty by a lack of international cooperation and continued instances of a lack of communication.

Despite the lack of immediate response to SARS, China eventually ameliorated their response and containment efforts. China recognized the lack of a centralized surveillance method to track new SARS cases and created local entities responsible for identifying new cases and sharing that information with Beijing.⁶⁸ This addressed one of the major flaws in stemming identifying where new cases were coming from and addressing those regions specifically. One of the most encompassing government measures was the identification of SARS as an infectious disease on April 8, 2003. This

⁶⁵ Freedman, Amy. "SARS and Regime Legitimacy in China." *Asian Affairs* 36, no. 2, 2005: 171.

⁶⁶ Ahmad, Amena, Ralf Krumkamp, and Ralf Reintjes. "Controlling SARS: a review on China's response compared with other SARS-affected countries." *Tropical Medicine and International Health* 14, no. 1, 2009: 42.

⁶⁷ Ibid, 42.

⁶⁸ Ibid, 38.

allowed the government to legally implement isolation measures like travel restrictions, quarantine, contact tracing, etc.⁶⁹ The same attribute that influenced the lack of transparency and communication in the early-stages of SARS are likely to thank for the effective and wide-reaching containment measures, the authoritarian nature of China.

Government restrictions to combat the virus eventually influenced the rise of community and social measures. Certain public establishments were closed, neighbors were encouraged to monitor and report unidentified SARS cases, and the public eventually adopted to the situation and started wearing and buying face masks in bulk.⁷⁰ The addition of community measures in China's response to SARS was likely a large reason for the short life-span of the virus. Without the community on board to heed government orders, and take it upon themselves to be proactive in curbing the virus, the lack of preparedness and timely response by the Chinese government might have resulted in insurmountable obstacles despite vast containment efforts.

The Chinese government's efforts towards creating a vaccine to prevent and cure SARS were mediocre at best. It was reported that on July 1, 2003, China had approved a vaccine for human testing that was concluded successful in animal tests.⁷¹ While it was noted that China was in need of the vaccine more than any other SARS-affected country, they were moving at a much faster rate than others which could call into question the safety surrounding human trials. As of the end of July 2003, when the virus was contained and no longer considered a global health concern, there was still no SARS

⁶⁹ Ibid, 38.

⁷⁰ Ibid, 41.; Sin, Maria Shun Ying. "Masking fears: SARS and the politics of public health in China." *Critical Public Health* 26, no. 1, 2016: 91.

⁷¹ "China Testing SARS Vaccine on Humans." *Chinese American Forum* 20, no. 1, 2004: 47.

vaccine suitable for human use.⁷² While not a problem specific to China, the inability of the international community, China included, to find a suitable vaccine during the pandemic are most likely explained by the novelty of the virus, effectiveness of containment methods, and indicative of a global unpreparedness for vaccine development in such a virus.

The response of China's health care system had both positive and negative outcomes. Still inflicted by the late response, China created local triage centers to screen for SARS cases but were soon overrun and eventually started to isolate probable SARS cases in entire hospitals.⁷³ Generally, China has avoided adequate funding in its health care system. Despite a below-average response to SARS mid-pandemic, China was noted to not have even have a properly prepared health care system before the pandemic. At the time of SARS, China was lacking technology, analysis skills, diagnostic means, and treatment methods; beyond that it was noted that officials would move sick patients as WHO officials were expected for investigation.⁷⁴ Despite some modest attempts of the Chinese health care system to combat the virus as it was unfolding, China was largely unprepared to deal with a situation like this and it seems to have showed.

The above synopsis of the Chinese government's efforts combatting SARS informs the pandemic report card found below in **Figure 4**. The reasoning behind each

⁷² Puska, Susan. "SARS 2002-2003: A Case Study in Crisis Management." *Chinese National Security: Decisionmaking Under Stress*. (Carlisle, PA: Strategic Studies Institute of the U.S. Army War College, 2005): 122.

⁷³ Ahmad, Amena, Ralf Krumkamp, and Ralf Reintjes. "Controlling SARS: a review on China's response compared with other SARS-affected countries." *Tropical Medicine and International Health* 14, no. 1, 2009: 41.

⁷⁴ Sachs, Jeffrey. "Comments on the Special Session on SARS*." *Asian Economic Papers* 3, no. 1, 2004: 134.

grade relates to information covered above. China's overall response was below average with a total score of 9.

Figure 5: Pandemic Report Card for China's Response to SARS

Characteristics	Grade	Reason
Surveillance, Investigation, and Protective Public Health Measures	B	(-) no pre-established surveillance entity, (+) government enacted widespread restrictions on citizens (+) community response mirrored the government and adopted quarantine measures and face masks.
Vaccine and Antivirals	D	(-) inadequate supply of antibiotics and flu medicine (-) no vaccine was created during the pandemic, (+) China actively sought vaccine trials
Healthcare and Emergency Response	D	(-) Chinese health care system was not adequately prepared, (-) local triage efforts were not adequate for demand (+) health care officials identified those most vulnerable and isolated them
Communication and Outreach	F	(-) China did not immediately notify international community and citizens of virus (-) China delayed WHO inspections (-) China censored media reporting of the virus.

Brazil and Zika in 2015

Zika has been a normal occurrence in Brazil in the past. However, during 2015, they experienced a large increase in babies born with neurological disorders, specifically Guillain-Barre syndrome and microcephaly, which was suspected to be connected to Zika.⁷⁵ This particular outbreak resulted in 1.5 million cases of Zika and above average

⁷⁵ Gomez, Eduardo, Fernanda Perez, and Deisy Ventura. "What explains the lackluster response to Zika in Brazil? Exploring institutional, economic and health system context." *BMJ Global Health* 3, no. 5, 2018: 1.

reports of babies with neurological disorders.⁷⁶ The large increase in infections eventually left Brazil and was noticed in other countries in the Americas, which lead the WHO to issue a Public Health Emergency of International Concern (PHEIC) in February 2016.⁷⁷ Due to information gleaned on the necessary long-term response to combat Zika and its related neurological disorders, the WHO ended the PHEIC on November 18, 2016.⁷⁸ Zika is spread through the *Aedes aegypti* mosquito by biting an infected person and then biting a healthy person which transmits the virus, sexual intercourse, or can be inherited through pregnancy.⁷⁹ Despite the concern raised about the 2016 Zika outbreak, symptoms are mild and deaths are rare, with the possible connection of Zika to neurological disorders fueling most of the concern behind the increase of cases. While antivirals have been used in some instances, there is currently no vaccine for Zika.

In terms of surveillance, Brazil succeeded in noticing the sudden increase in neurological disorders in connection to Zika rather quickly. Brazil had several platforms through which surveillance and investigation of upcoming epidemic threats are noticed, such as: the national notifiable information system, information systems on mortality, public hospital discharge, and the public health events registry which was created mid-epidemic in response to the anomaly.⁸⁰ Despite having a plethora of information systems to surveil for new cases, researchers have found them to be lacking depth in terms of

⁷⁶ “Zika Situation Report: Zika and Potential Complications.” *World Health Organization*. February 12, 2016.

⁷⁷ Kindhauser, Mary, Thomas Allen, Veronika Frank, Ravi Santhana, and Christopher Dye. “Zika: the origin and spread of a mosquito-borne virus.” *Bulletin of the World Health Organization*. February 9, 2016.

⁷⁸ “WHO ends Zika as a Public Health Emergency of International Concern.” *European Centre for Disease Prevention and Control*. November 23, 2016.

⁷⁹ Gallagher, James. “Zika outbreak: The mosquito menace.” *BBC*. January 29, 2016.

⁸⁰ Lowe, Rachel, Christoven Barcellos, Patricia Brasil, Oswaldo Cruz, Nildimar Honorio et al. “The Zika Virus Epidemic in Brazil: From Discovery to Future Implications.” *International Journal of Environmental Research and Public Health* 15, no. 96, 2018: 5.

identifiable factors of new patients which would help to evaluate risks to separate socio-economic contexts.⁸¹ As we have seen in the previous cases, surveillance is a vital aspect of epidemic response as it helps identify those most vulnerable and can inform actions to address the continuous influx of new cases. Overall, Brazil seemed prepared on this front, but lacked the necessary details in their systems to allow the government to narrow down afflicted areas to certain communities.

Researchers have not uncovered any active measures by Brazilian authorities to distort or suppress information concerning Zika. Once international organization like WHO and the Pan American Health Organization (PAHO) were introduced to the scene, communication and transparency were prioritized. With the 2016 Olympics coming to Brazil during the Zika epidemic, PAHO and Brazilian authorities worked together to combat the disease as well as provide timely information concerning the risks and combative measures taken.⁸² Despite transparency and open communication, Brazil's communication to the public was not adequate. The government often issued confusing communication regarding the risk of Zika, lack of transparency on public health data, and concerns over the continuation of the 2016 Olympics despite Zika caused public panic and a large amount of the scientific community publicly calling for the Olympic games to be canceled.⁸³

In light of the increased concern of the connection between Zika and other disorders, the Brazilian government issued a three-prong approach to the problem:

⁸¹ Ibid, 5.

⁸² "Response to the Epidemic of Zika Virus in the Americas." *Pan American Health Organization*. December 2015-2016: 27.

⁸³ Osorio-de-Castro Claudia, Elaine Miranda, Carlos de Freitas, Kenneth Camargo, and Hilarie Cranmer. "The Zika Virus Outbreak in Brazil: Knowledge Gaps and Challenges for Risk Reduction." *Am J Public Health* 107, no. 6, 2017: 962.

controlling the mosquito population, availability of healthcare, and development of technology and research capabilities.⁸⁴ As Zika is spread through mosquitos, the Brazilians recognized that the fundamental way to combat future cases was to reduce the vehicles through which the virus could be spread. Efforts to control the transmission vehicle, or vector, included mosquito population suppression, release of sterile mosquitos into the population, resident inspections to locate mosquito breeding grounds, pesticides, and removing mosquito habitats such as standing water.⁸⁵ Despite the importance of addressing the source of Zika transmission and the Brazilian government's heavy targeting of mosquito populations, they overlooked key fundamental problems with Brazilian infrastructure that negates some of their efforts.

Despite the Brazilian government's efforts to eliminate standing water at residences, the underlying lack of water and sewage infrastructure forces the population to continue to collect and add to standing water reservoirs. Around one-third of Brazilians do not have access to continuous public water and sanitation, which forces the population to keep standing water for use and open sewage flowing in uncovered drains and ditches.⁸⁶ Brazilian government procedure requires that local, state, and federal governments respond to sanitation concerns together, however poor economic considerations and bureaucracy have fueled an inadequate response to address the lack of infrastructure.⁸⁷

⁸⁴ Gomez, Eduardo, Fernanda Perez, and Deisy Ventura. "What explains the lackluster response to Zika in Brazil? Exploring institutional, economic and health system context." *BMJ Global Health* 3, no. 5, 2018: 2.

⁸⁵ Ibid, 2; Lowe, Rachel, Christoven Barcellos, Patricia Brasil, Oswaldo Cruz, Nildimar Honorio et al. "The Zika Virus Epidemic in Brazil: From Discovery to Future Implications." *International Journal of Environmental Research and Public Health* 15, no. 96, 2018: 8.

⁸⁶ Wurth, Margaret, Joao Bieber, and Amanda Klasing. *Neglected and Unprotected: The Impact of the Zika Outbreak on Women and Girls in Northeastern Brazil*. (New York, NY: Human Rights Watch, 2017): 23.

⁸⁷ Ibid, 24.

With access to health care being one of the pillars in Brazil's approach to Zika, it would be assumed that a heavy focus was placed on this factor. Granted, Brazil created Centers Specialized in Rehabilitation with the promise of creating even more to provide treatment to children infected with Zika, however, the health care infrastructure was disproportionately located in the regions not afflicted with heavy outbreaks.⁸⁸ Doctors and clinics are located in southeastern Brazil, while the poor northeastern region was ground-zero for the virus and the area most heavily afflicted.⁸⁹ Brazil tried to remedy their lack of knowledge surrounding Zika by pledging large amounts of money to research institutions and biobanks to collect and analyze bodily fluids.⁹⁰ Despite what seems like a wholistic response to the virus, the lack of preparation mentioned earlier set Brazil up for a mediocre response to Zika as mid-epidemic response were sporadic and untimely.

The above synopsis of the Brazilians government's efforts combatting Zika informs the pandemic report card found below in **Figure 5**. The reasoning behind each grade relates to information covered above. Brazil's overall response was average, with an overall score of 10.

⁸⁸ Gomez, Eduardo, Fernanda Perez, and Deisy Ventura. "What explains the lackluster response to Zika in Brazil? Exploring institutional, economic and health system context." *BMJ Global Health* 3, no. 5, 2018: 3.

⁸⁹ Ibid, 2.

⁹⁰ Ibid, 3.

Figure 6: Pandemic Report Card for Brazil's Response to Zika

Characteristics	Grade	Reason
Surveillance, Investigation, and Protective Public Health Measures	C	(+) Several surveillance entities (-) surveillance systems lacked depth (+) government implemented efforts to combat mosquito population (-) combative efforts often were inadequate to address institutional deficiencies.
Vaccine and Antivirals	C	(-) No vaccine for Zika (-) concentration on combating virus and not vaccine development (+) money pledged to research and development for a future vaccine.
Healthcare and Emergency Response	D	(+) Government created clinics to treat children with Zika (-) health care was not readily available in most-afflicted areas.
Communication and Outreach	D	(+) Government did not try to suppress information concerning virus (-) communication was inadequate and contributed to mass hysteria (+) PAHO and WHO were brought in to assess risk and communicate in preparation for Olympics (-) scientists disagreed with continuation of Olympics amid virus

Descriptive Statistics

This section will discuss the relevant descriptive statistics of the terrorist attacks in each country during the relevant timeframe. Each country will receive two tables and a graph. One table will show the distribution of terrorist attacks that occurred before, during, and after each pandemic. The next table shows the relevant descriptive statistics of each case, touching on the mean, median, mode, and standard deviation of the number of terrorist attacks. Next, a visual representation of the terrorist attacks via a scatterplot

and a trend line will aid the reader in understanding the overall trend of the number of attacks as we pass through each phase. It is important to note, that to help the audience, the scatterplot has been augmented with blue circles to show pre-pandemic activity, red squares for mid-pandemic levels, and yellow triangles for post-pandemic levels.

Mexico and Swine Flu

During the time frame of 2007-2011, Mexico experienced 26 terrorist attacks by multiple groups, with the majority of them falling in 2007. One can see a distribution of these attacks by year below in **Figure 7**. On the surface, we see something interesting to note. During the year that Swine Flu was rampant in Mexico, 2009, they experienced the lowest number of terrorist activity throughout the five-year span. Beyond that, the two years that preceded Swine Flu, 2007 and 2008, saw 18 total attacks, while the two years following Swine Flu, 2010 and 2011, only saw seven attacks.

Figure 7: Terrorist Attacks per year in Mexico before, during, and after Swine Flu

Grade	2007	2008	2009	2010	2011
16	10	8	1	5	2

To decide how the attacks mid-Swine Flu compare to the average during this timeframe, one needs to consult descriptive statistics. Shown below in **Figure 8**, we can see the mean of the number of terrorist attacks per year between 2007 and 2011. It is important to remember that the mean is often thrown off by outliers in the data set. The only data point, which could potentially be considered an outlier is the one terrorist attack in 2009. While mean is susceptible to outliers, it is considered an adequate unit of measurement in this scenario as compared to the median because the mean is still higher than the median. That means that the outlier did not have that much effect on the average.

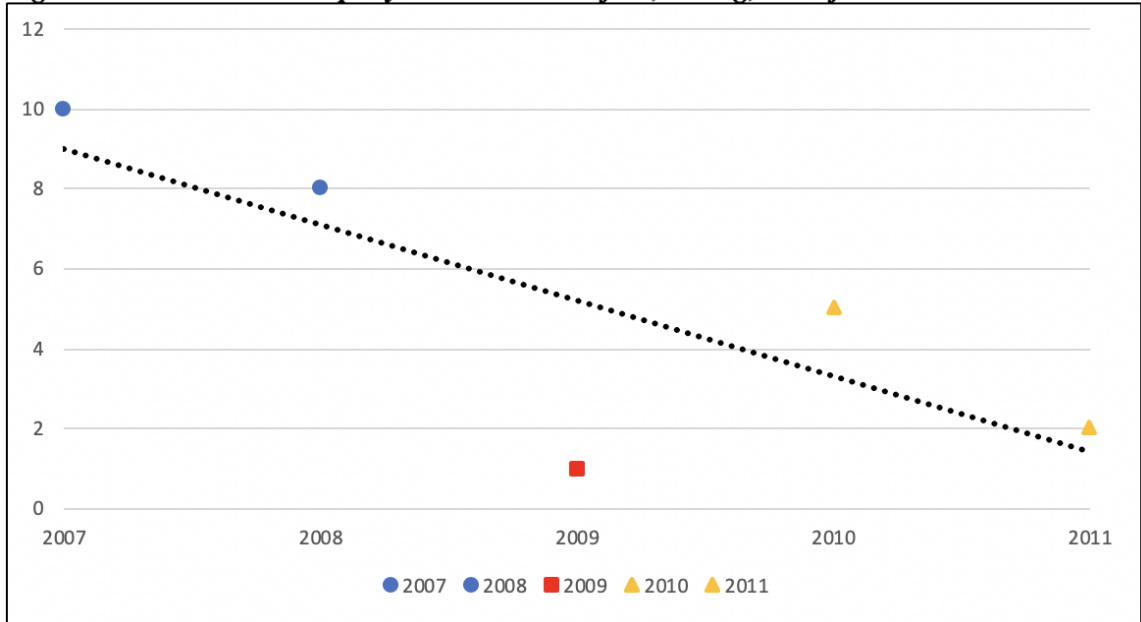
Upon analysis, with the average number of terrorist attacks for the timeframe being 5.2, the number of attacks in 2009 is well below average which further supports our hypothesis. The standard deviation of 3.8 also allows us to see that compared to the next case study, the data points are relatively close to the mean of 5.2 and only strengthens the trend line which will be introduced in the next paragraph.

Figure 8: Descriptive Statistics of Terrorist Attacks in Mexico before, during, and after Swine Flu

Mean	Median	Mode	Standard Deviation
5.2	5	-	3.8

The scatterplot below in **Figure 9** shows the overall trend of the datapoints. We can see that even before the pandemic presents itself, that the number of terrorist attacks in Mexico is decreasing. While this trend is established before the introduction of Swine Flu, the outlying data point in 2009 still provides support for our hypothesis that Mexico's response to the virus negatively influenced the number of terrorist attacks in Mexico that year. Interestingly enough, we also see that once the epidemic was considered to be over, the terrorist attacks rose back up to numbers above the outlier, but still stayed on the decreasing trend line.

Figure 9: Terrorist Attacks per year in Mexico before, during, and after Swine Flu



Overall, an analysis of this data in conjunction with the above average evaluation that Mexico received for their response to Swine Flu seems to provide preliminary support for the hypothesis. We see a steadily decreasing trend of terrorist attacks in Mexico between 2007 and 2011, with an extremely low outlier during the pandemic in 2009.

China and SARS

During the timeframe of 2000-2005, China experienced a total of 24 terrorist attacks. **Figure 10** below shows the distribution of these attacks by year. Similar to Mexico, China also experiences an overall decrease in the number of terrorist attacks per year. The lowest number of terrorist attacks seem to occur post-SARS.

Figure 10: Terrorist Attacks per year in China before, during, and after SARS

Grade	2000	2001	2002	2003	2004	2005
9	4	12	2	3	2	1

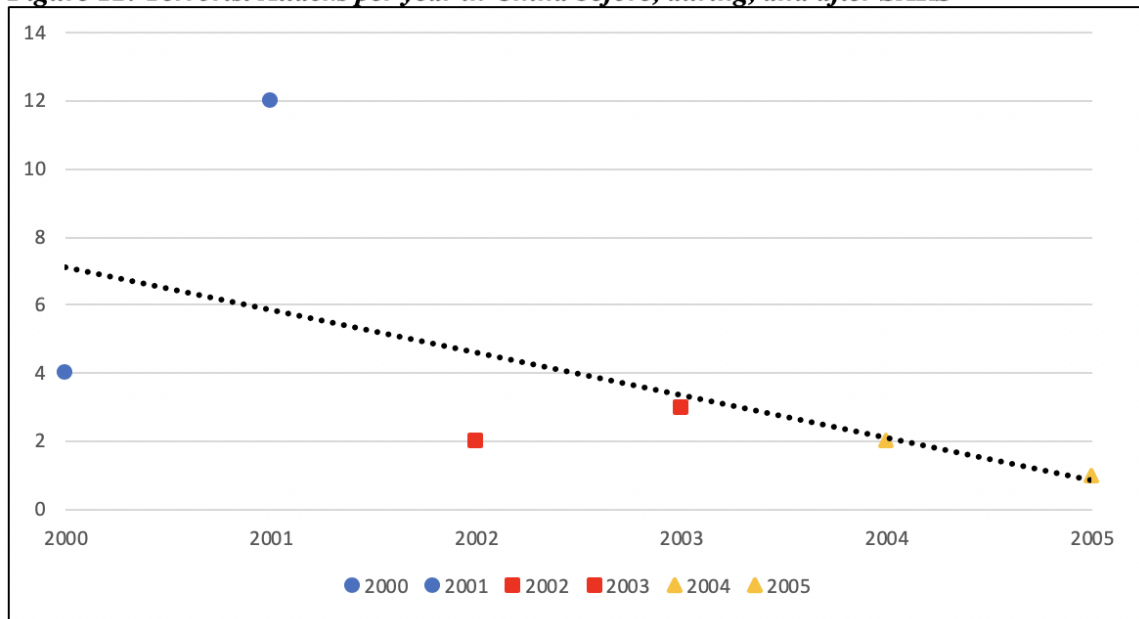
Once we look at the descriptive statistics of the number of terrorist attacks in China between 2000 and 2005 in **Figure 11**, we can see a bit evidence against our hypothesis. In this case, median is the better unit of measurement to show the average of terrorist attacks per year during this timeframe. The outlier of 12 during 2001 throws the mean off greatly to 4. Since the mean rose 1.5 points above the median, as suspected by an outlier of 12, it is relatively easy to decide that median better shows the average number of attacks per year. Concerning the number of terrorist attacks mid-SARS, we can see that they are right around the average number per year of 2.5. Furthermore, when we look at the pre-SARS numbers, we see that both are at or above the average and suggest that while the years during the epidemic saw an average number of terrorist attacks, when compared to the years before the epidemic, there is substantially less activity. We also see that level of activity continue to decrease post-SARS.

Figure 11: Descriptive Statistics of Terrorist Attacks in China before, during, and after SARS

Mean	Median	Mode	Standard Deviation
4	2.5	2	4

If we consult **Figure 12** below, one can see the overall trend of terrorist attacks steadily decreasing throughout the timeframe. Through the visualization, we can see that all but one of the data points, 12 in 2001, stuck within less than one standard deviation from the mean. This tells us that the trend is pretty consistent, and without the outlier in 2001, the negative trend line would likely look relatively similar to a horizontal, yet slightly decreasing, line.

Figure 12: Terrorist Attacks per year in China before, during, and after SARS



Unfortunately, the above charts and graph do not support the hypothesis for this project. As China's response was below average with a total score of 9, substantially worse in comparison to Mexico, we would expect to observe an increasing number of terrorist attacks per year. Adhering to the hypothesis, if not increasing, we would at least expect to see a sharp increase in terrorist attacks either during or after SARS given China's poor response to the virus. However, we see none of this. The outlier comes before the epidemic and therefore offers no support for the hypothesis.

Brazil and Zika

During the timeframe of 2013-2018, there were a total of 26 terrorist attacks in Brazil. **Figure 13** below shows a yearly distribution of these attacks. Brazil experienced a number of attacks, with the lowest amount occurring both mid- and post-Zika, while also experiencing a dramatic outlier of 11 attacks in 2018. While Brazil received an average evaluation, they were on the lower end of the spectrum with 10. This outlier could potentially provide support for our hypothesis as it is also possible that an increase in

terrorist attacks as a result of poor government response to a pandemic could be delayed a couple of years.

Figure 13: Terrorist Attacks per year in Brazil before, during, and after Zika

Grade	2013	2014	2015	2016	2017	2018
10	3	3	5	2	2	11

We get a clearer picture of the relationship once we look at the descriptive statistics offered in **Figure 14**. Given the outlier of 11 in 2018, we have to look closely at both the median and mean to determine which one better represents the average number of attacks over the course of the years. With the mean sitting at 4.3, .3 points above the median, it is possible to conclude that the outlier of 11 has skewed mean as an accurate unit of measurement. Therefore, we will proceed with the median, four, as the average. We see a bit of support for our hypothesis since the average number of attacks during Zika, 3.5, is relatively close to the average of 2013-2018. However, if we compare the average of mid-Zika numbers to the average of pre-Zika numbers, we see an increase of .5, which would not support the hypothesis. The average of post-Zika numbers is 6.5 and sit 2.5 points above the 2013-2018 average, which is attributed to the outlier in 2018.

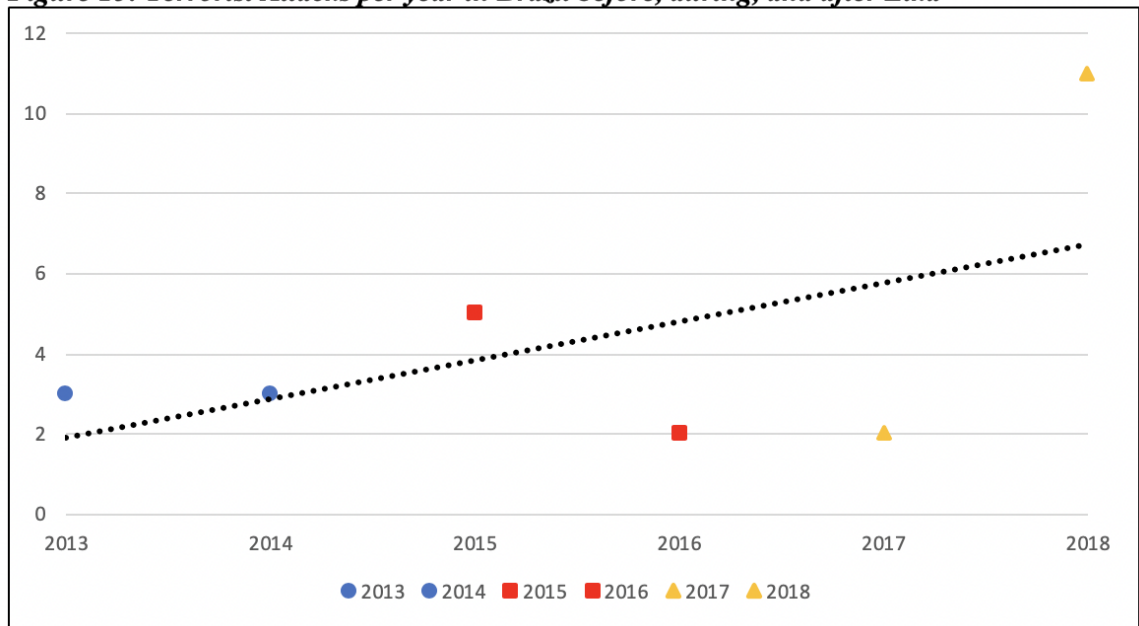
Figure 14: Descriptive Statistics of Terrorist Attacks in Brazil before, during, and after Zika

Mean	Median	Mode	Standard Deviation
4.3	4	2	3.4

When we look at the scatterplot and trendline of the number of terrorist attacks in **Figure 15**, we see instances of support and opposition for our hypothesis. The increasing trendline is likely due to the outlier in 2018. If we were to analyze the data points while excluding this outlier, we would see a relatively straight line which would support the hypothesis more of an average response receiving average trends of terrorism. While it

still may be true that increased terrorist numbers post-epidemic may be delayed by a couple of years, which would explain the outlier of 11 in 2018, we must approach this graph with caution. We must take into consideration all the data points, and therefore, the outlier of 11 in 2018 provides major opposition to our hypothesis as it skews the trend to be positive.

Figure 15: Terrorist Attacks per year in Brazil before, during, and after Zika



Implications for the Hypothesis

The above figures and discussion of their pertinent aspects results in little conclusive support for our hypothesis. The hypothesis would lead us to expect that Mexico, who received the best evaluation, would see a decreasing trend of terrorist attacks while China would see increases in terrorist activity, and Brazil would see a constant and relatively un-changing trend line. While we do see moments of support, such as the overall trend of terrorist activity in Mexico, and the trend of Brazil minus an outlier, the case of China and random outliers present in some datasets leads me to conclude that these trend lines might be explained by another variable. Overall, I

conclude that there is not substantial evidence to support the alternate hypothesis, and as of now, there seems to be no significant relationship between how a government responds to a pandemic and the level of terrorism that country experiences.

Considerations

While I conclude that there is not ample evidence to support my hypothesis, there are considerations and implications that this work can have for future scholars. This paper evaluated the government response as a whole and sought to statistically connect those grades to levels of terrorism. Future related research projects would likely do well to dissect the IV of this paper into several separate IVs and evaluate one at a time. Doing this would allow the researcher to narrow down their focus and more accurately evaluate the government's response to the epidemic in that domain. Another avenue for future research would be to choose different cases to analyze, as scholars have already noted that democracies and autocracies differ in their reasons to respond to natural disasters and how effectively they do so.⁹¹

Furthermore, the DV measured the level of terrorism. This DV did not consider fluctuations in violence in general, like violent crime. Violent crime would likely yield more data points and paint a better picture of how government response to a pandemic influences the level of violence in average citizens, and not those select few who are active in terrorist groups. Another avenue that would prove fruitful for future research is changing the DV to measure other methods of political violence, rather than terrorism. As mentioned in the literature review, groups seek to erode state legitimacy through both violent and non-violent means. It would be interesting to see if government response to a

⁹¹ Quiroz Flores, Alejandro, and Alastair Smith. "Leader Survival and Natural Disasters." *British Journal of Political Science* 43, no. 4, 2013: 821.

pandemic influences non-violent repertoire like social services, propaganda, or non-violent protests. It is possible that the DV was not as affected by the IV because the population saw any government restrictions as a response to the pandemic as temporary. Perhaps future research would do well to conduct interviews of an affected population mid-pandemic to glean more into their opinion of their government's response and how they feel about any government restrictions as a result of it.

Furthermore, I applied a U.S.-based document of the HHS to evaluate the efforts of these governments. Future projects could conduct the same evaluation with a different grading structure, as well as guiding it off of a separate pandemic response document. While conducting research for this project, I discovered a large vacuum for a potential database. There remains no substantial database which evaluates a country's response to a pandemic. The void of a database like this means that any research done on a topic with a variable related to the one in this paper will always likely result in differing evaluations of a country's response to a pandemic. Creating a centralized database which other scholars and researchers can refer to is likely the most important consideration of this work for future research on the topic.

Conclusion

The above work compares government responses to a pandemic to that country's level of terrorism. There remains a vast scholarly discussion that touches on several variables which explains an increased level of violence, this paper sought to choose those variables which are often consequences of a government response to an epidemic and explore if, in the context of a viral epidemic, they continue to influence instances of terrorism. While there was not enough concrete information to conclude a significant

relationship between these two variables, this paper addressed an under-studied aspect of social science and provided avenues for continued future research into the topic. This topic needs continued research as pandemics and terrorism have remained a constant throughout world history.

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Curriculum Vita

Jake Lewis was born on May 3, 1996 in Niceville, Florida. He received his Bachelor of Arts from Coastal Carolina University in 2018 where he majored in Intelligence and National Security Studies and minored in Religious Studies. Jake also participated in the French language immersion program at Middlebury College. Following his undergrad career, Jake helped his father create his business, 1-800 Packouts of Columbia. He then helped establish 1-800 Packouts of Coastal Carolina, a separate location in Myrtle Beach, South Carolina while responding to Hurricane Florence. Jake completed an internship with Red Five Security where he collected open-source intelligence to increase client privacy and inform physical security teams of day-to-day activity. Jake interned at the Near East South Asia Center for Strategic Studies, and then returned as a government contractor where he helped facilitate programs that hosted foreign military and government officials. Jake has momentarily returned to Lexington, South Carolina to help his family business while he completes his master's program at Johns Hopkins University.